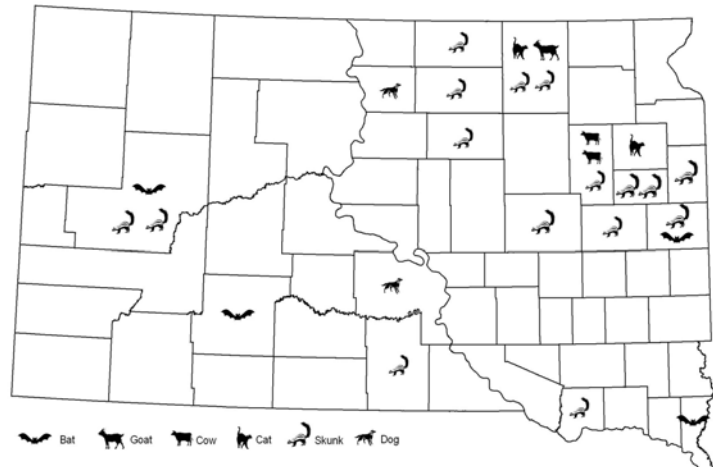


# Rabies Surveillance, South Dakota, 2007

Rabies is a fatal viral disease and a serious enzootic public health concern in South Dakota. In 2007, 633 animals were submitted for rabies testing with 27 animals testing positive. This is a decrease of -29% from last year and is the fourth consecutive year of decreasing rabies and the lowest number of rabid animals reported in South Dakota since at least 1960. The 27 rabid animals included 20 wild animals (16 skunks and 4 bats) and 7 domestic animals (2 cats, 2 cattle, 2 dogs and 1 goat). The last human rabies case in South Dakota was in 1970.

Animal rabies, South Dakota, 2007



Animal	2007		1998 - 2007		
	Pos	Total tested	Pos	Total tested	% Pos
Skunk	16	35	646	944	68%
Bat	4	99	61	2112	3%
Cat	2	226	50	2598	2%
Dog	2	133	50	1762	3%
Cattle	2	66	100	1120	9%
Goat	1	3	3	20	15%
Raccoon	0	29	1	478	0%
Horse	0	11	39	293	13%
Rodents*	0	7	0	134	0%
Deer/elk/donkey/llama	0	5	0	78	0%
Fox	0	4	3	53	6%
Weasel/ferret/mink	0	3	0	39	0%
Opossum	0	2	0	41	0%
Sheep	0	2	0	80	0%
Badger	0	1	1	8	13%
Coyote/wolf	0	1	0	26	0%
Mountain lion	0	1	0	3	0%
Rabbits/hares	0	1	0	13	0%
Squirrel/chipmunk	0	1	0	66	0%
Woodchuck	0	1	1	20	5%
Bison	0	0	0	5	0%
Bobcat/bear	0	0	0	2	0%
Muskrat	0	0	0	22	0%
Pig	0	0	0	7	0%
Shrew/mole	0	0	0	3	0%
Other animals	0	2	0	9	0%
<b>TOTAL</b>	<b>27</b>	<b>633</b>	<b>955</b>	<b>9,936</b>	<b>10%</b>

\*Rodents: rat, mouse, prairie dog, gopher, beaver, porcupine, vole

Animals testing negative in 2007 include 224 cats, 131 dogs, 95 bats, 64 cattle, 29 raccoons, 19 skunks, 11 horses, 5 deer, 4 fox, 3 rats, 2 each goat, mink, mouse, opossum and sheep, and 1 each badger, coyote, ferret, gerbil, gopher, mountain lion, otter, rabbit, kangaroo, squirrel and woodchuck.

In 2007 rabid animals were detected in 18 South Dakota counties (see map and table). Animals were submitted for testing from all counties except Bennett, Campbell, Harding, Mellette, Perkins, Sully and Ziebach.

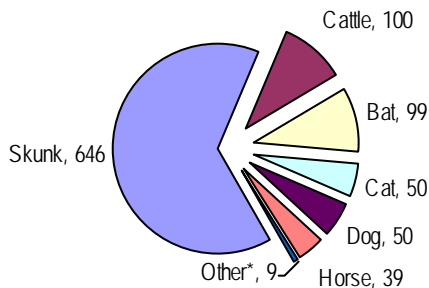
During the 10-year period (1998-2007) 955 of 9,936 (10%) animals tested were positive for rabies. During these years animals were tested from all counties, and rabid animals were detected in all counties except Bennett, Shannon, Todd, and Ziebach. The most animals were submitted for testing from Minnehaha County (2,309), whereas Ziebach County submitted the fewest (1).

Since 1998, 25% of rabies cases in South Dakota have been domestic animals. There were 50 rabid dogs and 50 rabid cats, many of which were unvaccinated strays. Rabid livestock included 100 cattle, 39 horses and 3 goats.

The common skunk (*Mephitis mephitis*) is the enzootic rabies reservoir in South Dakota. Since 1998, 68% of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with 61 of 2,112 (3%) bats testing positive since 1998.

Although rabies is not enzootic in other wild animals in South Dakota, since 1998 rabies has been detected in 3 foxes, 1 badger, 1 raccoon, and 1 woodchuck. These other animals are likely spillover rabies following exposure to rabid skunks.

**Rabid animals, South Dakota 1998-2007**



\*Others include fox 3, goat 3, raccoon 1, badger 1, woodchuck 1.

Although rabid animal events occur throughout the year in South Dakota, most rabies events occur during the spring and summer months.

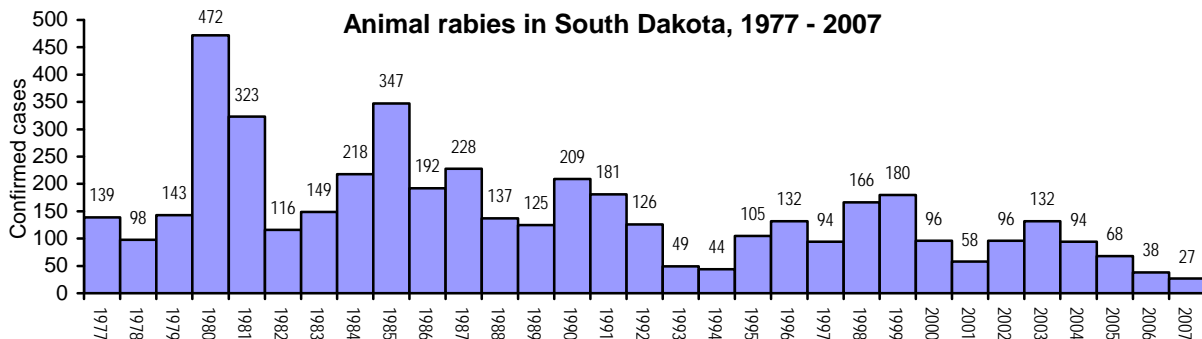
In 2007 a resident of our neighboring state, Minnesota, died of bat rabies. Nationally there have been 25 human rabies cases in the United States since 2000. Eighteen of the human cases (72%) were associated with a bat-rabies virus, 6 (24%) had dog virus (all foreign imports), and 1 (4%) was a raccoon virus variant. Four of the bat virus cases were not exposed directly by bat bites, but by organ transplant from a human donor who died from bat rabies. These 25 human rabies cases were from Arkansas, California (6), Florida, Georgia, Indiana, Iowa, Minnesota (2), Mississippi, New York,

**Animal rabies cases by County, 1998 – 2007**

County	2007		1998 – 2007		
	Pos	Neg	Pos	Neg	% Pos
Aurora	0	2	15	46	25%
Beadle	1	8	27	129	17%
Bennett	0	0	0	5	0%
Bon Homme	1	4	11	54	17%
Brookings	2	28	48	432	10%
Brown	4	27	52	317	14%
Brule	0	4	11	70	14%
Buffalo	0	2	1	6	14%
Butte	0	14	15	174	8%
Campbell	0	0	6	18	25%
Charles Mix	0	10	28	144	16%
Clark	3	11	22	72	23%
Clay	0	5	8	90	8%
Codington	1	16	29	213	12%
Corson	0	1	4	6	40%
Custer	0	3	3	30	9%
Davison	0	13	22	289	7%
Day	0	9	29	84	26%
Deuel	1	10	24	132	15%
Dewey	0	5	4	23	15%
Douglas	0	1	8	31	21%
Edmunds	1	5	11	55	17%
Fall River	0	1	2	107	2%
Faulk	1	7	12	38	24%
Grant	0	8	17	114	13%
Gregory	0	2	11	68	14%
Haakon	0	4	4	31	11%
Hamlin	2	10	37	127	23%
Hand	0	3	14	56	20%
Hanson	0	1	8	28	22%
Harding	0	0	3	16	16%
Hughes	0	21	16	207	7%
Hutchinson	0	14	30	184	14%
Hyde	0	3	8	73	10%
Jackson	1	0	1	33	3%
Jerauld	0	1	7	41	15%
Jones	0	1	3	12	20%
Kingsbury	1	11	37	147	20%
Lake	0	19	23	180	11%
Lawrence	0	11	9	105	8%
Lincoln	0	10	5	163	3%
Lyman	1	2	1	39	3%
Marshall	0	4	24	84	22%
McCook	0	7	24	118	17%
McPherson	1	3	13	70	16%
Meade	3	11	11	150	7%
Mellette	0	0	1	7	13%
Miner	0	7	14	62	18%
Minnehaha	0	128	68	2,241	3%
Moody	0	7	32	123	21%
Pennington	0	44	13	804	2%
Perkins	0	0	4	17	19%
Potter	0	1	3	12	20%
Roberts	0	8	17	147	10%
Sanborn	0	2	17	40	30%
Shannon	0	1	0	41	0%
Spink	0	3	12	77	13%
Stanley	0	2	2	17	11%
Sully	0	0	4	4	50%
Todd	0	1	0	57	0%
Tripp	1	5	12	91	12%
Turner	0	13	20	188	10%
Union	1	10	5	72	6%
Walworth	1	26	24	253	9%
Yankton	0	16	9	116	7%
Ziebach	0	0	0	1	0%
<b>South Dakota</b>	<b>27</b>	<b>606</b>	<b>955</b>	<b>8,981</b>	<b>10%</b>

Oklahoma, Puerto Rico, Tennessee, Texas (4), Virginia and Wisconsin (2).

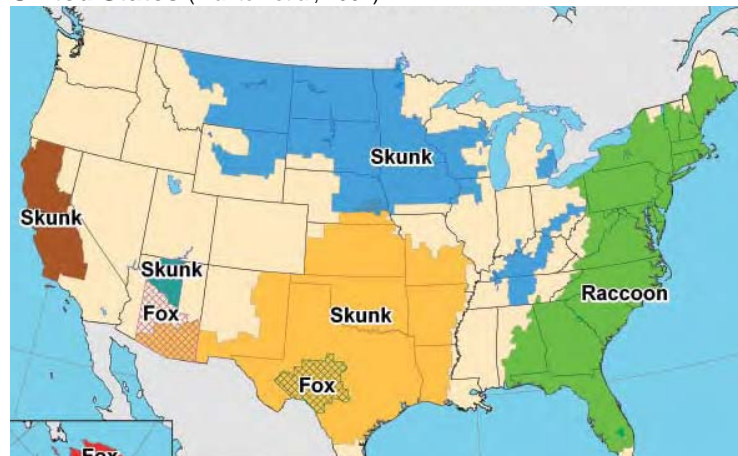
The latest national animal rabies surveillance data reported are for year 2006 (Blanton, et. al., 2007). Nationally, there were 6,940 cases of animal rabies reported in 2006, which is an 8.2% increase over the previous year. According to Blanton 92% of the 2006 rabies cases were wild animals and 8% were domestic animals. Nationally in 2006 domestic animals included 318 cats, 82 cattle, 79 dogs, 53 horses/mules, 11 goats/sheep, 3 pet ferrets and 1 llama. Nationally, wild animals testing positive for rabies included 2,615 raccoons, 1,692 bats, 1,494 skunks, 427 foxes, 66 mongooses, 43 groundhogs, 30 bobcats, 10 coyotes, 6 deer, 3 otters, 2 opossums and 1 each cougar, fisher, rabbit, ringtail and wolf-hybrid.



Two laboratories offer rabies tests in South Dakota: (1) the Animal Disease Research Diagnostic Laboratory (ADRDL) in Brookings, and (2) the State Public Health Laboratory (SDPHL) in Pierre. Both laboratories use the direct fluorescent antibody (DFA) technique. The ADRDL performed 389 rabies tests on South Dakota animals in 2007 with 12 being positive (3.1%); and the SDPHL performed 244 tests in 2007 with 15 being positive (6.1%). The case definition of a confirmed animal rabies case is a positive DFA test, performed preferably on central nervous system tissue, or isolation of the rabies virus in cell culture or in a laboratory animal. Human serum rabies antibody titers on previously vaccinated people may be ordered through SDPHL.

Rabies consultations are available from the Office of Disease Prevention, South Dakota Department of Health, 7 days a week. Consultations are based on current Centers for Disease Control and Prevention (CDC) recommendations\*. We strive to recommend appropriate rabies prevention measures and to minimize unnecessary and inappropriate post-exposure testing and prophylactic treatment.

**Distribution of terrestrial rabies virus variants in the United States** (Blanton et al, 2007)



## References and resources

\*CDC. Human rabies prevention – United States, 1999: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1999; 48 (RR-1). [www.cdc.gov/mmwr/PDF/rr/rr4801.pdf](http://www.cdc.gov/mmwr/PDF/rr/rr4801.pdf)

CDC. Compendium of animal rabies prevention and control, 2007: National Association of State Public Health Veterinarians, Inc. MMWR 2007; 56 (RR-3). [www.cdc.gov/mmwr/PDF/rr/rr5603.pdf](http://www.cdc.gov/mmwr/PDF/rr/rr5603.pdf)

CDC. Compendium of measures to prevent disease associated with animals in public settings, 2007: National Association of State Public Health Veterinarians, Inc. MMWR 2007; 56 (RR-5). [www.cdc.gov/mmwr/PDF/rr/rr5605.pdf](http://www.cdc.gov/mmwr/PDF/rr/rr5605.pdf)

Blanton, JD, CA Hanlon and CE Rupprecht. 2007. Rabies surveillance in the United States during 2006. Journal of the American Veterinary Medical Association 231: 540-556.  
[www.cdc.gov/rabies/docs/rabies\\_surveillance\\_us\\_2006.pdf](http://www.cdc.gov/rabies/docs/rabies_surveillance_us_2006.pdf)

## Addresses, telephone numbers and websites

### Department of Health (rabies consultations)

615 East Fourth Street  
Pierre, SD 57501-1700  
Phone: 1-800-592-1861 or 605-773-3737;  
after hours cell phone 605-280-4810  
Web:  
<http://doh.sd.gov/DiseaseFacts/Rabies.aspx>

### Department of Health, Public Health

**Laboratory** (rabies testing)  
615 East Fourth Street  
Pierre, SD 57501-1700  
Phone: 1-800-592-1861 or 605-773-3368  
Web: <http://doh.sd.gov/Lab/rabies.aspx>

**CDC Rabies homepage:** [www.cdc.gov/rabies](http://www.cdc.gov/rabies)

### Animal Disease Research and Diagnostic Laboratory (rabies testing)

Box 2175, North Campus Drive  
South Dakota State University  
Brookings, SD 57007-1396  
Phone: 605-688-5171  
Web: <http://vetsci.sdstate.edu>

### South Dakota Animal Industry Board

(livestock and other animal veterinary and regulatory issues)  
441 S. Fort Street, Pierre, SD 57501-4503  
Phone: 605-773-3321  
Web: [www.state.sd.us/aib](http://www.state.sd.us/aib)

### South Dakota Bat Working Group

<http://nathist.sdstate.edu/SDBWG/SDBWG.html>

## Two rabies laboratories in South Dakota: Brookings and Pierre

### **Pierre: Submission of specimens to the South Dakota Public Health Laboratory for Rabies Testing**

615 East Fourth Street, Pierre, SD 57501-1700

1. Call the South Dakota Department of Health to report the possible exposure and to seek guidance in how to submit the animal for testing. Call 800-592-1861 or 605-773-3737 during regular business hours. For emergencies, after hours, on weekends or holidays, call the mobile phone (605-280-4810). Staff will be able to answer questions and concerns. If at all possible, please call before destroying the suspect animal.
2. Call one of the above numbers to make special arrangements for shipping an animal specimen after regular business hours, on weekends or holidays.
3. Notify the South Dakota Public Health Laboratory (SDPHL) of all impending shipments of animal specimens before actual transport. Call the lab at 800-592-1861 or 605-773-3368 during regular business hours. After hours, on weekends or holidays, contact an individual listed in #1.
4. Be careful not to destroy the head of the animal by gunshot or bludgeoning. Take the animal to a veterinarian for removal of the head in order to preserve the brain tissue and prevent unnecessary exposure to a diseased animal.
5. Include with the specimen, a SDPHL submission form with the following information:
  - Name and birth date of person exposed (or owner if pet exposure)
  - Type of animal and exposure, including exposure date/suspect animal death date
  - Symptoms and/or unusual behavior of suspect animal
  - Name and phone number of veterinarian or physician
 (Submission forms are available from veterinarians or physicians)
6. Wrap animal head carefully and either ship or deliver directly to the lab in an insulated container with ice or ice packs. SPECIMEN MUST NOT BE FROZEN. Transport the specimen by the quickest means possible.

Direct additional questions to SDPHL 605-773-3368.

<http://doh.sd.gov/Lab/rabies.aspx>

### **Brookings: Submission of rabies specimens to Animal Disease Research & Diagnostic Laboratory**

Box 2175, North Campus Drive, South Dakota State University, Brookings, SD 57007-1396

Source : South Dakota Animal Disease Research & Diagnostic Laboratory User's Guide (8/7/07),  
<http://vetsci.sdstate.edu/userguide/ADRDL%20Users%20Guide%208.07.07.pdf>

Animals suspected of having rabies that have exposed a human should be euthanized and tested as soon as possible, and staff at the ADRDL is qualified to perform the needed rabies FA test. Since the FA test is so quick and reliable, after hours testing is rarely required anymore; however, ANY AFTER HOURS, WEEKEND OR HOLIDAY EMERGENCY RABIES TEST should be directed to the South Dakota Public Health Laboratory in Pierre.

#### **HOW TO SUBMIT RABIES-SUSPECT CASES TO ADRDL**

To meet CDC guidelines for rabies testing, the ENTIRE BRAIN WITH BRAINSTEM must be submitted FRESH to the laboratory. This will allow for testing of both sides of the brain and brainstem as per CDC guidelines. ADRDL staff will fix the brain from domestic animals and some wild animals in formalin for histopathology examination after rabies testing has been completed.

1. Package the brain in a sterile plastic bag placed inside a crush-proof container. Submit to the lab in an appropriate leak-proof, insulated shipping container with adequate ice packs to keep specimen chilled during shipping. DO NOT FREEZE the fresh brain.
2. As always, the laboratory WILL NOT ACCEPT LIVE ANIMALS for rabies testing. Whole bodies, complete heads, or removed brains are all acceptable specimens for submission. ADRDL staff will remove brains upon arrival, at no additional charge.

3. Fill out the standard ADRDL submission form with complete information, including the rabies section at the bottom. Clearly identify as a rabies suspect and clearly indicate if human exposure has occurred with the route of exposure and date included. A referring veterinarian must be listed on the form. The submission form can be downloaded from <http://vetsci.sdstate.edu>

4. Samples arriving to the laboratory before 12 PM (noon) will have results available the same day. Samples arriving after 12 PM (noon) will be tested the next business day.

5. Additional tests, if requested, will not be performed on a rabies suspect case until the rabies FA has been completed and is negative.

6. The ADRDL is open 8 AM to 5 PM Monday through Friday, excluding holidays. A SPECIMEN DROP-OFF COOLER is accessible to the public 24 hours a day, so samples can be delivered to the lab on nights or weekends and left in this cooler for testing the next business day. The cooler is adjacent to the loading dock on the east side of the building. The on-call diagnostician can be reached at (605) 690-1576 if problems or questions arise.

7. Testing after hours, weekends or holidays IS NOT AVAILABLE at the ADRDL. See information from the State Public Health Lab.

### **FEE POLICY**

**DOMESTIC ANIMALS** - The fee is \$42 for South Dakota clients and \$48 for out-of-state clients. This fee includes not only the rabies FA test, but also routine histopathology and additional laboratory testing (such as virology and/or bacteriology) if requested or found necessary to determine the cause of the animal's death. A \$10 necropsy fee is added if a necropsy is requested for the purpose of further diagnostics. If needed, toxicology testing fees are extra.

**WILD ANIMALS** - Wild animals that originated in South Dakota and have caused a "significant risk to human health" (see definition below), will be accepted for rabies testing NO CHARGE to the submitter. The South Dakota Game, Fish and Parks Department pays for the testing under these circumstances and only the rabies FA test is completed (no additional testing). Wild animals that have not caused a risk to human health can be submitted for rabies testing, but the submitter will be charged the same fee as for domestic animals. If adult bats are submitted with bat pups (baby bats), only the adults will be tested.

**HUMAN HEALTH RISK DEFINITION** - The exposure of a human or domestic animal to saliva from the suspect animal either through a bite, exposure of mucous membranes, exposure of an open wound, or scratches.

OR

The exposure of a human or domestic animal to central nervous system tissue from the suspect animal either through exposure of mucous membranes or exposure of an open wound.

### **RESULTS AND REPORTING**

1. Laboratory results are reported by telephone as soon as they are available to the referring veterinary clinic listed on the submission form.

2. Test results are reported as "no test" when ANY part of the brain required for testing (per CDC guidelines) is missing for any reason (including autolysis, trauma and/or only half of brain submitted fresh) and the FA result is negative.

3. Test results are also reported as "no test" when brain tissue cannot be identified for any reason (most often due to marked autolysis and/or severe brain trauma) and the FA test is not performed.

4. In addition to the referring veterinary clinic, all POSITIVE rabies FA results from domesticated animals will also be reported to the State Health Department and Animal Industry Board in the state where the animal resided.

5. All POSITIVE rabies FA results from wild, non-domesticated animals will be reported to the State Health Department, the Animal Industry Board and Game, Fish and Parks Department in the state where the animal resided; additionally, the referring veterinary clinic (if one is listed) will also be notified.

## South Dakota Rabies Control Laws

### **RABIES CONTROL STATUTE: Chapter 40-12 (Section 12-1, 2, 3, 4, 5, 6)**

40-12-1. Confinement of animals required in localities where rabies exists -- Neglect as misdemeanor. In localities where rabies exists, the animal industry board may require that any animal deemed likely to spread such disease shall be muzzled, caged, tied or confined in any manner that may be deemed necessary. It is a Class 1 misdemeanor for any owner or person in charge of any animal so ordered to be muzzled, caged, tied or confined, to refuse or neglect to carry out such order.

40-12-2. Destruction of rabid animal required. If the animal industry board determines that rabies exists in any animal, the board may kill such animal and any animal there is reason to believe has been bitten by any animal affected with rabies.

40-12-4. Definition of terms. Terms used in this chapter mean:

- (1) "Department," the department of health;
- (2) "Owner," any person who has a right of property in a pet, keeps or harbors a pet or who has it in his care or acts as its custodian, or permits a pet to remain on or about any premises occupied by him;
- (3) "Pet," any dog, cat or other species of carnivore kept for domestication or display.

40-12-5. Confinement of pet after attack upon person -- Violation as misdemeanor. The department may serve written notice upon the owner of any dog or cat which has attacked or bitten a person to confine the animal at the owner's expense upon his premises or at a city pound or other place designated in the notice for a period of at least ten days after the animal has attacked or bitten any person. The department may examine the animal at any time within the ten-day period of confinement to determine whether such animal shows symptoms of rabies. In the case of any pet other than a dog or cat, which has attacked or bitten a person, the department may serve written notice upon the owner of such animal that the owner shall have the animal euthanized immediately and submit the brain to an approved laboratory for rabies examination. Any owner who fails to comply with a written notice served pursuant to this section is guilty of a Class 1 misdemeanor.

40-12-6. Confinement of pet bitten by animal suspected of having rabies -- Violation as misdemeanor. The department may serve written notice upon the owner of a dog or cat known to have been bitten by an animal known or suspected of being affected by rabies, requiring the owner to confine such dog or cat for a period of not less than six months. However, if such dog or cat had been properly treated with an antirabic vaccine, confinement shall be for a period of not less than three months. In the case of any pet other than a dog or cat, the department may serve written notice upon the owner of such animal that the owner shall have the animal euthanized immediately. Any owner who fails to comply with a written notice served pursuant to this section is guilty of a Class 1 misdemeanor.

**SHERIFF: Chapter 7-12 (Section 7-12-29)** Taking and holding animal suspected of being dangerous -- Formal determination -- Disposal of dangerous animal. The sheriff may take possession of any animal suspected of being dangerous. The sheriff may hold such animal until a formal determination can be made of the extent of the danger such animal poses. If the animal has attacked or bitten a human or an animal pet, the formal determination shall include consultation with the Department of Health for the purposes of rabies control. The sheriff may dispose of any animal so determined to be dangerous.

**REPORTABLE DISEASES: Administrative Rule 44:20:01:03** Category I reportable diseases have a potential for epidemic spread or require rapid application of public health measures to prevent a serious threat to public health or safety. Category I reportable diseases include: Rabies, human and animal;

### **CONTROL MEASURES: Administrative Rule 44:20:03:10**

44:20:03:10. Application of public health measures to animals. The department may instruct a person who owns or is in possession of an animal known or suspected to be a carrier of an infectious agent in public health measures for preventing infection and spread of disease. If the department knows or has reason to believe, because of testing or epidemiological information, that an animal is infected with an infectious agent and is a threat to the public health, it may issue a public health notice directing the person who owns or is in possession of the animal to take one or more of the following actions:

- (1) To examine or test the animal to determine whether it is infected with an infectious agent capable of causing human disease
- (2) To report to an authorized department representative for counseling on methods for preventing transmission of the infectious agent;
- (3) To confine or quarantine the animal for the duration of the incubation period or contagious period;
- (4) To destroy the animal or provide treatment until it is cured or free from the infection and to follow measures for preventing reinfection;
- (5) To cease from specific activities involving the infected animal that endanger the health of others;
- (6) To cooperate with the department in implementation of reasonable public health measures.

**Health requirements for dogs and cats on exhibit: Administrative Rule 12:02:10:03** All dogs for exhibition must be accompanied by a health certificate signed by a licensed accredited veterinarian within 30 days before entry to the South Dakota State Fair. The health certificate shall indicate the dates of vaccination for rabies, canine distemper, and canine parvovirus. All vaccines must be current. All cats for exhibition must be accompanied by a health certificate signed by a licensed accredited veterinarian within 30 days before entry to the South Dakota State Fair. The health certificate shall indicate the dates of vaccination for rabies and feline distemper. All vaccines must be current.

**Health certificate for imported cats and dogs: Administrative Rule 12:68:06:09** Any cat or dog imported into South Dakota must be accompanied by a health certificate as described in SDCL 40-14-2 issued by a state or federal government veterinary official of the originating state or by a licensed veterinarian. The certificate must state that the animal has not been exposed to rabies, that it is free from signs of any contagious or communicable disease, that it has been currently vaccinated by a licensed veterinarian, the date of vaccination, the type of vaccine used, and the date the animal is due for boosting for rabies immunization.